Extreme weather events (EWEs) during a single season, such as those that occurred during the cool season 2016–2017 and are discussed by Bosart et al. (2017) in a subsequent presentation, can contribute disproportionately to temperature and precipitation anomaly statistics for that particular season. This disproportionate contribution suggests that (1) EWEs need to be considered in describing and understanding the dynamical and thermodynamic processes that operate at the weather–climate intersection and (2) consideration of EWEs may improve operational probabilistic medium-range (8–10-day) temperature and precipitation forecasts. It is apparent that considerable variability characterizes the antecedent environments over the North Pacific prior to the development of EWEs over the continental U.S. This variability motivated the development of a North Pacific Jet (NPJ) phase diagram that was constructed employing the two leading EOFs of 250-hPa zonal wind during Sept.–May 1979–2014 in the CFSR. The NPJ phase diagram provides an objective tool to characterize the NPJ regime and the evolution of the upper-tropospheric flow pattern over the North Pacific prior to the development of EWEs.

This presentation will employ the NPJ phase diagram to classify NCEP GEFS forecasts of EWEs over the continental U.S. based on the NPJ regime at the time the forecast was initialized. Subsequently, GEFS forecasts of EWEs initialized during the same NPJ regime will be examined to determine whether certain NPJ regimes are characterized by increased or reduced medium-range forecast skill with respect to EWEs. Knowledge of both the antecedent conditions conducive to the development of EWEs and the predictive skill of medium-range forecasts of EWEs over the continental U.S. has the potential to improve forecasts of EWEs in the 8–10-day period. The NPJ phase diagram also applies more generally to upper-tropospheric flow patterns during periods not associated with EWEs. Given this more general applicability, the characteristics and skill of all medium-range GEFS forecasts will be examined in the context of the NPJ phase diagram during Sept.–May 1985–2014. Predicated on the applicability of the NPJ phase diagram to periods with and without EWEs, a web interface for real-time NPJ phase diagram products has been developed and will be illustrated.